

<b>Notice of Allowability</b>	Application No.	Applicant(s)
	10/658,275	HICKEY ET AL.
	Examiner Dah-Wei D. Yuan	Art Unit 1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to 6/8/06.
2.  The allowed claim(s) is/are 36-40 and 44-73.
3.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All
  - b)  Some\*
  - c)  None
  1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

#### Attachment(s)

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 06082006
4.  Examiner's Comment Regarding Requirement for Deposit of Biological Material
5.  Notice of Informal Patent Application (PTO-152)
6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

**SORFC SYSTEM WITH NON-NOBLE METAL ELECTRODE COMPOSITIONS**

Examiner: Yuan      S.N. 10/658,275      Art Unit: 1745      July 31, 2006

**Detailed Action**

1. The Applicant's amendment filed on June 8, 2006 was received. The specification and abstract were amended. Claims 1-35,41-43 were cancelled. Claims 36,44 were amended. Claims 49-73 were added.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on March 13, 2006.

***Claim Rejections***

3. The claim rejections under 35 U.S.C. 112, second paragraph, on claims 36-48 are withdrawn. The phrase "sufficient reducing atmosphere" is understood as "an amount of reducing atmosphere which prevents the negative electrode from oxidizing". The claim rejections under 35 U.S.C. 102(e) as being anticipated by McElroy et al. (US 2004/0081859 A1) on claims 36,39-43,45 are withdrawn because the independent claim 36 has been amended. The claim rejections under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over McElroy et al. (US 2004/0191595 A1) on claims 36-43,46,47 are withdrawn because the independent claim 36 has been amended.

***Reasons for Allowance***

4. Claims 36-40,44-73 are allowed. The invention of independent claim 36 recites a method of operating a solid oxide regenerative fuel cell comprising providing a sufficient reducing atmosphere to the negative electrode when the solid oxide regenerative fuel cell operates in the electrolysis mode, wherein the negative electrode comprises no noble metal or an unavoidable trace impurity amount of the noble metal. The closest prior art of record, McElroy et al., teach the use of platinum mixed with YSZ or LSM as the fuel electrode. The invention of independent claim 49 recites a method of operating a solid oxide regenerative fuel cell comprising providing a sufficient reducing atmosphere to the negative electrode when the solid oxide regenerative fuel cell operates in the electrolysis mode, wherein the negative electrode comprises less than 1 mg/cm<sup>2</sup> of noble metal and at least one of Ni, Cu, Fe or a combination thereof with an ionic conducting phase. The closest prior art of record, McElroy et al., teach the use of platinum mixed with YSZ or LSM as the fuel electrode. The invention of independent claim 62 recites a method of operating a solid oxide regenerative fuel cell comprising providing a sufficient reducing atmosphere to the negative electrode when the solid oxide regenerative fuel cell operates in the electrolysis mode, wherein the negative electrode comprises less than 1 mg/cm<sup>2</sup> of noble metal, generating hydrogen at the negative electrode in the electrolysis mode by electrolysis of water vapor; providing remaining water vapor and the generated hydrogen to a water-hydrogen separator to separate the hydrogen from water; providing the separated hydrogen to a compressor; providing a first portion of the compressed hydrogen to a hydrogen storage vessel; and providing a second portion of the compressed hydrogen to the negative electrode to

maintain the sufficient reducing atmosphere at the negative electrode. The closest prior art of record, McElroy et al., does not teach or suggest the method of operating a solid oxide regenerative fuel cell as stated in the claim.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (571) 272-1295. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dah-Wei D. Yuan  
July 31, 2006



DAH-WEI YUAN  
PRIMARY EXAMINER